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3. DERMAL SHIELDS OF HIMALAYAN TAHR (*HEMITRAGUS JEMLAHICUS*)

(With a text-figure)

INTRODUCTION

Recent field work on ungulate behavior and social organization has shown that competing males may injure their opponents in fights which establish dominance and determine access to females for breeding (e.g. Geist 1964, Clutton-Brock *et al.* 1982, Berger 1986). Many of these studies have also shown that such injuries may have long term effects on the competitive ability of males. Males should be expected, therefore, to possess effective defensive mechanisms as well as offensive ones. Defensive behavior is readily evident in the fighting behavior of many species. For instance, the head-low posture of South African oryx (*Oryx gazella*, Walther 1980), the scarcity of physical contact in mountain goats (*Oreamnos americanus*, Geist 1964), and the spinning around of Nilgiri tahr (*Hemitragus hylocrius*, Rice 1984), are all methods of minimizing the damage that can be inflicted by the opponent. Horns also have a defensive function, as is shown most clearly by South African oryx (Walther 1980). Dermal shields are another defensive mechanism which protect the body against injury from the horns or antlers of an opponent. Geist (1971) has shown how the thickness of the skin in several caprids is greatest in areas most likely to receive horn blows. The area of thickening is dependent on the method of fighting em-

ployed by a particular species (Geist 1971: 149). In addition, Jarman (1972) and Sokolov and Danilkin (1979) have shown how dermal shields are absent in hornless and antlerless females and poorly developed in young males of impala (*Aepyceros malampus*) and roe deer (*Capreolus capreolus*) respectively. This paper describes the dermal shields of Himalayan tahr (*Hemitragus jemlahicus*) and suggests how they are related to the methods of fighting employed by this species.

MATERIAL AND METHODS

On 23 November 1986 a 5 year old male in the collection of Himalayan tahr at the New York Zoological Park lost a dominance fight with a previously subordinate male. The fight was not observed but the keeper in charge of the tahr had reported other fights during the few days previous. The male's condition deteriorated subsequently and he died after 13 days. Prior to necropsy, sections of skin were excised at several places and their thickness measured against a millimeter scale.

RESULTS

Examination of the body of the tahr showed numerous long scrapes on the side of the thorax, flank, and ventrum. Some of these had bled, but not severely. These minor external

injuries contrasted markedly with the extensive subdermal haemorrhages in these areas. The thickness of the dermis at various locations is shown in Fig. 1.

DISCUSSION

The location and orientation of these injuries are consistent with the method of fighting in reverse parallel stance, in which the contestants stand parallel to each other facing opposite directions and delivering blows with the horns up and sideways into the body of the opponent. Dominance fights of wild Himalayan tahr have not been described in print,

but observations on captive groups have included this type of fighting (Schaller 1978, Hassenberg 1981). According to Hassenberg (1981), the reverse parallel stance results when males follow through from a glancing frontal horn clash, after which the males hook back and up with the horns. Male Nilgiri tahr also fight in reverse parallel orientation (Rice 1984) and combine the horn blows with pushing shoulder to shoulder, a tactic which may be employed by Himalayan tahr as well.

The skin of the male Himalayan tahr was near maximum thickness on its ventrum and along the side of its rib cage, areas where it bore numerous scarpes, and where many of

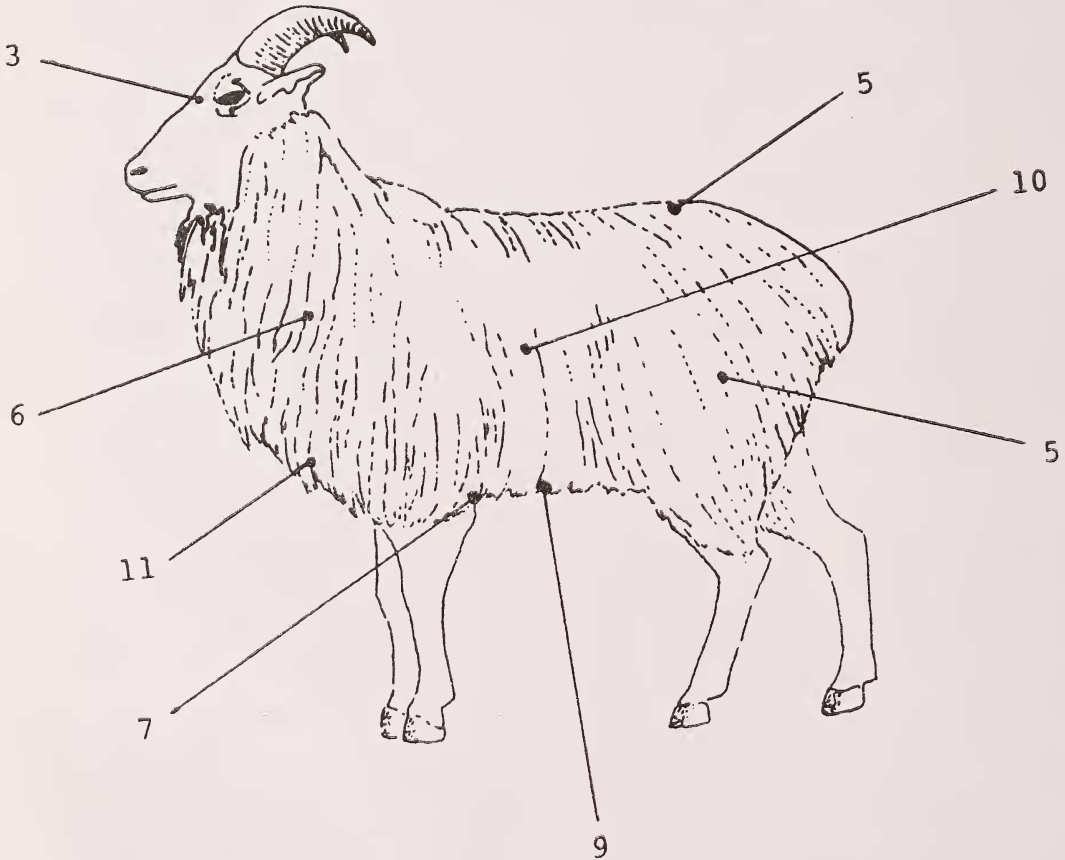


Fig. 1. Thickness (in mm) of 5 year old male Himalayan tahr skin at various locations.

the blows would be expected to fall when reverse parallel fighting. The lack of thickened skin on the rump contrasts with the situation in mountain goat which has its thickest skin in this area (Geist 1967). This corresponds to the fighting position of shoulder to shoulder in tahr, compared to the head to tail orientation of mountain goats (Geist 1964). The

thickness of the skin on the chest of the male Himalayan tahr suggests a need for protection for that area of the body, but few blows would likely be delivered there in reverse parallel fighting. Perhaps quick hooks following frontal clashing would, and further observations of dominance fights in Himalayan tahr may bear this out.

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4. A SHORT NOTE ON A NEW FOUND GROUP OF TAHR

This is a report on an isolated pocket of Nilgai Tahr (*Hemitragus hylocrius*) in the southernmost reaches of the Western Ghats in the Veerapuli range of forests in the district of Kanyakumari in Tamil Nadu. The Tahr is found in four adjacent hillocks, locally called Variadu Mottai (Tamil for Tahr Butte). These hills at 8° 26'N and 77° 22'E reach an altitude of about 3,000 feet (c. 1000 m). The area can be described as

montane grassy hill tops with riverine gallery forests on its slope and base. The Nilgiri Tahr inhabits mainly the steep cliffs that form part of the topography of the area. The hills overlook the Pechipara reservoir to the northwest and Perunchani reservoir to the south. The next nearest herd to these hills lives in the Pechiparai cliffs and Kalamali hills more than a distance of 20 km separates them.

In the last seven years I have made many